

Internet Predictions

Article Summaries

Participatory Sensing: Applications and Architecture

Deborah Estrin

In participatory sensing, individuals and communities use mobile phones and cloud services to collect and analyze systematic data for use in discovery. The stage is set for this technology to dramatically impact many aspects of our daily lives.

The Impact of Sense and Respond Systems

K. Mani Chandy

All living things sense what is going on in their environments, detect significant events such as threats and opportunities, (implicitly) predict probable futures, and respond. Information technology enables enterprises to sense and respond more effectively than ever before. This paper introduces sense and respond systems, discusses the forces that are driving their use, and identifies hurdles faced in their widespread deployment.

The Play's the Thing

R. Michael Young

The interactive entertainment industry has undergone significant changes in its 50-year history, but is poised to undergo much more significant changes with the advent of Internet-based game services and the ubiquity of smartphones and GPS. The ability to create games where computation is shared across game clients and a range of game services will bring access to high-end graphics and other game features to a much broader class of computer user. Furthermore, it will enable new types of gameplay where the content of each game is

dynamically adapted to the player's preferences, location, and social context.

The Growing Interdependence of the Internet and Climate Change

Larry Smarr

The paradox of the rapidly expanding use of Internet computing is that it's becoming a significant contributor to global greenhouse gas emissions, while at the same time its increased use could help decrease emissions from the building, transportation, and electrical grid sectors. University and college campuses are ideal "living laboratories" for system-level experimentation on how the innovative use of Internet computing technologies can lead to a greener future.

The Internet and Past and Future

Andrew Odlyzko

Precise technology predictions are impossible, as is shown by extensive experience. However, general trends in technology and markets suggest that the convergence of wireless with the Internet Protocol will have a large and likely surprising impact on the Internet.

Fighting over the Future of the Internet Communications Revolutions

David Clark

Technologists like to think that it is their inventions that define the future, but for the Internet, deeply embedded in society, it will be issues like economics, culture, and law that will shape its future. Technological innovation will be successful only if it fits into these larger constraints. A critical factor about these

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larger constraints is that arguments about preferences go on forever, in what I have called a tussle over outcomes. Advocates tussle over things like regional identity, the preservation of local norms and laws, and economic advantage. I catalog some important tussles that we should watch if we want to understand the forces that will shape the future Internet.

Back to the Future of Internet

Viviane Reding

Setting the right policy is key to ensuring that the future Internet is open to technical innovations, is fast, reliable, and secure, and available to anyone. With emerging challenges such as the growing amount of data, there's a need to act now. Smart energy grids and transport systems can bring substantial cost savings to citizens, and the introduction of IPv6 can allow for the development of a fully connected world. Getting the digital trust and confidence right could provide us with additional growth, but failure to act will result in great losses.

Intercultural Collaboration Using Machine Translation

Toru Ishida

Even for supporting local schools, which include students from different countries, we need worldwide collaboration to generate all the necessary language services. Machine translators are half-products. Multicultural communities have to customize and use machine translators to fit their own context. The obvious first step is to combine a domain-specific and community-specific multilingual dictionary with those translators. Even if translation quality is increased, we can't solve all communication problems through translation, so we must deepen our knowledge of different cultures. Wikipedia will become a great resource for intercultural collaboration when combined with machine translators.

The New Way of Business

Sharad Sharma

Business innovation at the bottom of the pyramid is creating new delivery systems for education, healthcare, and government services. These innovations will blowback into more mainstream markets in the next 10 years, and firms will organize themselves differently to become much leaner. To manage the knowledge workers inside these firms, a new paradigm of connect and collaborate will come to the fore.

Future Imperfect

Vint Cerf

As the second decade of the 21st century dawns, predictions of global Internet digital transmissions reach into exabytes per year by 2013. Traffic levels might easily exceed many zettabytes by the end of the decade. Setting aside the challenge of somehow transporting all that traffic and wondering about the sources and sinks of it all, we might also focus on the nature of the information being transferred, how it's encoded,

whether it's stored for future use, and whether it will always be possible to interpret as intended.

As we look toward a future filled with an increasingly large store of digital objects, it's vital that we solve the problems of long-term storage, retrieval, and interpretation of our digital information. Without such attention, we'll preside over an increasingly large store of bits whose meaning has disappeared over time. We can hope that the motivation to circumvent such a future will spur creative solutions and the means to implement them.

Warehouse-Scale Computers

Urs Hölzle and Luiz André Barroso

Large data centers have emerged as a new class of machines, bringing along some of the most challenging design and programming problems in computing today.

The Internet of Things: Here Now and Coming Soon

Geoff Mulligan

The Internet of Things first mentioned in 1999—that seed of an idea—has taken root, and as it grows, it impacts both our everyday lives and the Internet itself. Tiny battery-powered smart objects, some as small as a dime, are today being connected to the Internet to sense the environment, energy usage, and human activity. Over the coming years, these types of inexpensive devices will permeate our homes and businesses, and it's crucial that we start to explore the social, privacy, and technology issues so we are ready to deal with billions of nearly invisible Internet ready devices.

Interplanetary Internetworking

Adrian Hooke

The internationalization of space exploration motivated the extension of TCP/IP-like techniques to support the long delays and intermittent connectivity characteristic of space communications.

GENI: Opening Up New Classes of Experiments in Global Networking

Chip Elliott

The Global Environment for Network Innovations (GENI) is a suite of research infrastructure components rapidly taking shape in prototype form across the US. It's sponsored by the US National Science Foundation, with the goal of becoming the world's first laboratory environment for exploring future Internets at scale, promoting innovations in network science, security, technologies, services, and applications. □

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